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Editorial

Our first objective is to publish scientific articles within the field of dentistry. For this purpose, some specialists from various parts of the world have contributed with us, so I would like to acknowledge and thank them for their help on evaluating the received manuscripts. Without their dedication and expertise, the Indian Journal of Dental Education could not publish its scientific articles.

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Endodontic Treatment of Radiculous Maxillary Premolars: Two Case Reports

*Ehsan Sharifi, **Hamid Abbaszadeh, ***Hamid Jafarzadeh,****Mohammad Mortazavi

*Department of Endodontics, Faculty of Dentistry and Dental Research Center, Mashhad, Iran.,**Department of Endodontics, Faculty of Dentistry and Dental Research Center, Mashhad, Iran.,***Department of Endodontics, Faculty of Dentistry and Dental Research Center, Mashhad, Iran., ****Department of Endodontics, Faculty of Dentistry and Dental Research Center, Mashhad, Iran

Abstract

Maxillary premolars have highly variable root canal morphology, but the possibility of three canals, especially in the second premolar, is quite low; however, it must be considered in clinical and radiographic evaluations during endodontic treatment. These case reports describe the diagnosis and successful clinical management of two patients with three-rooted maxillary first and second premolars.

Keywords: Anatomical variations, maxillary premolar, root anatomy.

Introduction

Maxillary premolars may have one, two, or three roots and canals (1). The majority of anatomical studies found that the most common form of the maxillary first premolar is the two-rooted form. All of the anatomical studies found that the most common form of the maxillary second premolar is a single root (2).

Successful endodontic therapy is dependent on the cleaning, shaping and obturation of the entire root canal system. Therefore, successful root canal therapy requires a thorough knowledge of tooth anatomy and root canal morphology, which may be quite variable within the norm (2).

Although three-rooted maxillary premolars are rare, the possibility of extraroots or canals should be considered to ensure successful endodontic treatment.

Different studies have been done about the anatomy of maxillary premolars in different races that have reported different

Reprints requests: Dr. Hamid Abbaszadeh Faculty of Dentistry, Vakilabad Blvd Mashhad, Iran, P. O. Box: 91737-984 Tel: 0098 915 800 2580 Email: hamidabbaszade@yahoo.com estimated incidence about three-rooted maxillary premolars (Tables 1 and 2).

In this manuscript, two cases of maxillary first and second premolars are presented.

Case reports

Case 1

A 32-year-old male presented at the dental clinic of the Faculty of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran, because of spontaneous pain in maxillary left first premolar.

The pulp had been exposed by a deep carious lesion and tooth had spontaneous pain and pain during chewing.

Diagnostic tests showed that tooth was not sensitive to electric pulp testing (Vitality Scanner, Analytic Technology, Glendora, CA, USA), cold (ice stick), heat (hot burnisher), and palpation. The tooth had moderate pain on percussion.

Radiographic findings were consistent of periapical radiolucency and carious lesion on the distal surface (Fig. 1), so periodontal status was diagnosed as "chronic apical periodontitis" and pulpal status as "necrosis".

The tooth was isolated with rubber dam and the coronal access was prepared. After

Authors	One canal (%)	Two canals (buccal and palatal) (%)	Three canals (two buccal, one palatal) (%)	Race
Pineda and	50.1	49.4	0.5	Spanish
kuttler (3)	2011		012	Spanion
Carns and	22	72	6	American
skidmore (4)				(Morgantown)
Vertucci (5)	26	69	5	American
				(Florida)
Walker (6)	36	64	0	Chinese
Pecora et al (7)	17.1	80.4	2.5	Brazilian (São
				Paulo)
Caliskan et al (8)	9.8	90.2	0	Turkish (Izmir)
Kartal et al (9)	9.7	88.6	1.7	Turkish (Istanbul)
Soares and	_		Case report	Brazilian
Leonardo (10)				(Diamantina)
Woodmansey (11)	_	_	Case report	American
				(Montana)
Jafarzadeh (12)	_	_	Case report	Iranian (Mashhad)
Javidi et al (13)	-	_	Case report	Iranian (Mashhad)
Arisu and Alacam	_	_	Case report	Turkish (Ankara)
(14)				

Table 1: Studies of Apical Canal Configurations for the Maxillary First Premolar

Table 2: Studies of Apical Canal Configurations for the Maxillary SecondPremolar

	One canal (%)	Two canals	Three canals (two	Race
		(buccal and	buccal, one palatal)	
Authors		palatal)	(%)	
		(%)		
Pineda and	81.8	18.2	0	Spanish
kuttler (3)				
Vertucci (5)	75	24	1	American
				(Florida)
Barkhordar and	_	_	Case report	American (San
Sapone (15)				Francisco)
Pecora et al (16)	67.3	32.4	0.3	Brazilian (São
				Paulo)
Caliskan et al (8)	72	28	0	Turkish(Izmir)
Kartal et al (9)	55	44.3	0.7	Turkish (Istanbul)
Loh (17)	49.4	50.6	0	Singaporeans
Ferreira et al (18)	_	-	Case report	Brazilian (São
				Paulo)
Low (19)	_	_	Case report	Hong Kongese
Soares and	_	_	Case report	Brazilian
Leonardo (10)				(Diamantina)



Fig. 1: Diagnostic radiograph of maxillary first premolar

Fig. 2: Working length radiograph: two initial files and one missed canal (a) Working



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placing the initial files (K-file, Maillefer, Dentsply, Switzerland) and taking radiograph to determine working length, an extra root canal was noted (Fig. 2a). Two buccal canals and one palatal canal were found as suggested by another working length radiograph (Fig. 2b). Cleaning and shaping of each of three canals was performed by passive step back technique up to file #25 (for buccal roots) and 30 (for

Fig. 3: Obturation radiograph: three filled canals



palatal root) and gates gliddens #1, 2, 3 and 4. NaOCI was used as irrigant. Finally the canals were filled by lateral condensation technique using gutta-percha and sealer (AH26, Dentsply DeTray, Konstanz, Germany) (Fig. 3).

This treatment was executed in a single session.

Case 2

A 26-year-old female presented at the dental clinic of the Faculty of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran, because of spontaneous pain and pain caused by cold and heat in maxillary left second premolar. The patient described the pain following cold and heat which appeared delayed and continuous. Also patient stated pain during chewing and also a history of restorative treatment on given tooth.

The pulp had been exposed by a deep carious lesion. Diagnostic tests showed that tooth was sensitive to electric pulp testing (Vitality Scanner, Analytic Technology, Glendora, CA, USA) (point scale 5), cold (ice stick), heat (hot burnisher) and not sensitive to palpation. The tooth had slight pain on percussion.

Radiographic findings were consistent of loss of lamina dura and PDL widening (Fig. 4), so periodontal status was diagnosed as "chronic apical periodontitis" and pulpal status as "chronic irreversible pulpitis".



Fig. 4: Diagnostic radiograph of maxillary second premolar

Fig. 5: Working length radiograph: three initial files



The tooth was isolated with rubber dam and restoration was removed and the coronal access was prepared. Two buccal canals and one palatal canal were found as suggested by initial diagnostic radiograph (Fig. 4). The pulp was extirpated and working length of tooth was determined by using K-files (Maillefer, Dentsply, Switzerland) (Fig. 5). Cleaning and shaping of each of three canals was performed by passive step back technique up to file #25 (for buccal roots) and 30 (for palatal root) and gates gliddens #1, 2, 3 and 4. NaOCI was used as irrigant. Finally the canals were





filled by lateral condensation technique using gutta-percha and sealer (AH26, Dentsply DeTray, Konstanz, Germany) (Fig. 6). This treatment was executed in a single session.

Discussion

Endodontic success in teeth with extraroots or canals requires a correct diagnosis and careful clinical and radiographic evaluation. Morphological variation in pulpal anatomy must be considered. Although preoperative radiography gives a two-dimensional image of a threedimensional object, there are some guides that suggest the presence of extra-canals/ roots. Whenever there is an abrupt straightening or loss of radiolucent canal in the pulp cavity, an extra-canal should be suspected, either in the same root or in other independent roots (10). Also, whenever the mesiodistal width of the mid-root image is equal to or greater than the mesiodistal width of the crown, the tooth most likely has three roots (20). Multiple canals are also common when a radiograph shows an intracanal instrument as eccentric in the root (8).

When confronted with unusual tooth anatomy as three rooted maxillary premolars, good illumination and magnification can make treatment easier. With the aid of an operating microscope or loop, it is possible to locate all the root canal orifices (14). When there are three roots, an oval or triangular cavity is often found, with the corners falling over the canal orifices (8).

Some studies have advocated a T-shaped access outline (20). Balleri et al (21) suggested that the outline of the access cavity was shaped by a cut at the bucco-proximal angle from the entrance of the buccal canals to the cavo-surface angle.

An apex locator was used to estimate the working lengths prior to establishing a working length estimation radiograph. This improves the chance of estimating the correct length when canals are likely to be superimposed on a radiograph (14).

Since getting a successful outcome in some of anatomic variations is difficult, a comprehensive assessment of the anatomy and a true diagnosis can help all practitioners, so considering all of the above can lead clinicians to successful treatment.

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A Study on the Reasons of Noncompliance with Tooth Brushing in Young Males of Azadshahr Region of Yazd, Iran

*Moeintaghavi A, **Mazloomi SS, ***Ghahraee F *Associate Professor of Periodontics, Faculty of Dentistry and Dental Research Center, Mashhad University of Medical Sciences, Mashhad, Iran,**Associate professor in Health Education, Shahid Sadoughi University of Medical Sciences and Health Services, Yazd, Iran, ***Dentist

Abstract

Plaque control is the most important way in prevention of periodontal disease and caries. On the other hand, tooth brushing is the best and important mechanical way for plaque control. Poor compliance of patients in response to oral hygiene instruction is a common problem. The aim of this study was to evaluate the reasons of poor compliance with brushing in Azadshahr region of YAZD (Iran). 90 Non compliant and 90 compliant men (15-39 years) were recruited and interviewed during home visit. Their knowledge, attitude toward oral heath and their compliance with tooth brushing were evaluated. The results showed that factors in non compliance with brushing were as follows: inadequate knowledge about oral heath. The number of family members, economic status, lack of knowledge about the effect of oral disease on cardio-vascular problems, logistic analysis showed that increase in knowledge about oral heath almost doubled compliance with brushing. Some reasons had been mentioned by the non compliant people for their non compliance with brushing was as follows in descending order: being tired because of daily work being busy. The most important factors in compliance with brushing were as follows in descending order: Prevention of dental caries Having good breath

Key words: Tooth brushing- Compliance- Oral hygiene

Introduction

Periodontal diseases can be prevented through adequate oral hygiene practices and a periodontal maintenance program (1). Excellent long-term personal oral hygiene can modify the quantity and quality of subgingival plaque (2,3). Many failures in the treatment of periodontal diseases can be due to inadequate oral hygiene (4). Procedures for supra gingival plaque control are as old as recorded history. Hippocrates (460-377 BC) included in his writings commentaries on the importance of removing deposits from the tooth surfaces

Reprints Requests: Dr. A. Moeintaghavi Dept. Periodontics, Faculty of Dentistry Mashhad University of Medical Sciences Vakilabad Blvd., Postcode: 91735-984 Mashhad, Iran E-Mail:Moeentaghavia@mums.ac.ir Mobile: 09155023227, Tel: 0511 8829501 (5). Currently the use of a tooth brush and fluoridated tooth pastes are almost universal. The use of interdental cleaning devices, mouth rinses and other oral hygiene aids are less well documented, but available evidences tend to suggest that only a small percentage of the population use such additional measures on a regular basis (6).

The usefulness of a social cognitive approach to compliance with brushing and flossing behavior recommendations was tested with 39 patients recruited from the state university of New York at Buffalo periodontal disease clinical research center by Tedesco et al. In 1991.Results indicated that positive attitudes, believes, and norms for brushing and flossing and positive intentions to brush but less intention to floss (7).

Azadshahr is one of the Yazd regions (center of the state of Yazd, Iran) with a population of about 38500; and 9137 families, All of them are nearly of the same social class. Our previous study in this region showed that 34.5% of men did not brush regularly. The aim of this study was to evaluate the reasons of non compliance with brushing.

Materials and Methods

In this descriptive analytic study, 180 males (15-39 years) at Azadshahr region of Yazd, Iran were recruited. 90 men who had not brush their teeth were selected as test group and 90 men who had brushed regularly and didn't show clear dental plaque according to Sillness and Loe plaque index (8) were recruited as control.

The subjects were selected by cluster sampling method and after filling a written inform consent, filled up a relevant questionnaire at the time of examination. The validity of the questionnaire was determined by specialists and the reliability was verified during test retest method.

The two groups then were compared to determine the reasons for non compliance with brushing.

The knowledge was scored in the following manner: 0-9: poor

10-14: fair 15-20: good

Mean scores of knowledge in two groups were compared using Mann-Whitney U test. The chi-square test was used to evaluate the relationship between brushing and other factors.

Table [·]	1: 1	The	comparisor	ו of	the	mean	score	of	knowledge	in	two	group)S
									0				

Group	Knowledge-level Average	S.D
Compliant with brushing	13.963	2.07
Non-compliant with brushing	10.832	1.947
Total	12.398	2.54

12.398

Mann	Whitney	U	test	Ρ	value=0.0001
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Table 2. The comparison of distribution frequency of the responses to the following question: Does oral/dental problems affect heart and other organs?

Repose	Yes		No		Unwae		Total	
Giap	Ninhar	Racert	Ninha	Recent	Ninhar	Racat	Ninha	Recet
Compliant withbushing	72	59.5	2	11.1	16	39	90	50
Non- compliant withbushing	49	405	16	889	25	61	90	50
Total	121	67.2	18	10	41	21	180	100

Chi-square=17.239 P value=0.0001

Results

The mean score of knowledge in control and test groups were 13.96 and 10.832, respectively. Man Whitney U test showed significant difference between two groups. (Table 1)

59.5% of subjects, mentioned that non compliance with brushing affected other

organs such as heart, brushed their tooth while 40.5% did not brush.

88.9% of the subjects who mentioned that periodontal disease had no effect on heart and other organs did not brash while the rest (11.1%) brushed. (Table 2)

The chi square test showed significant relationship between believing in the effect

Table 3. The comparison of distribution frequency of brushing according to the size of families in the given society.

The size families	1-2 membe	E	3-4 mem	bers	5-6 mem	bers	7-10 mem	bers	Total	20
Graup	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Compliant\with brushing	13	65	41	53.2	25	43.9	11	423	90	50
Non-compliant with brushing	7	35	36	46.8	32	.56.1	15	57.7	90	50
Total	20	11.1	77	42.8	57	31.7	26	14.4	180	100

Chi-square=13.6 P value=0.0308

of oral diseases on heart/other organs and brushing (P=0.0001).

Table 3 indicates that 65% of those who were from small families (<2members) brushed regularly while 35% did not brush.

57.7% of subjects from large families (with 7-10 members) did not brush while 42.3% of them brushed. Chi-square test showed that significant relationship between the number of people in each family and brushing in society (R=0.0308).

Table 4. Relationship between literacy and compliance with brushing

Literacy	Lower than hi	gh school	High school	High school Diploma and		
	diploma		higher			
Group	Number	Percent	Number	Percent		
Compliant	28	31.1	62	68.9		
with brushing						
Non-	53	58.9	37	41.1		
compliant						
with brushing						
Total	81	45	99	55		

X²=14.02 D.f=1P value=0.000

31.1% of men who brushed regularly were under high school diploma while this stood 58.9% for those who did not brush. Chi square test showed a significant relationship between education and brushing (Table 4).

51.6% of those who had no income brushed while 48.4% of them didn't.

75% of those who had an income higher than 200 \$ brushed but remaining 25% didn't.

Table 5.	Reasons	for	brushing	in	patients	who	brushed	regular	٦ly

Reasons	Value
Prevention of dental caries	178
Prevention of halitosis	104
Aesthetic reasons	54
Oral/dental health and cleanliness	50
Pain relief	11
Other organshealth	11
Prevention of gingivitis	7
Prevention of plaque formation	6
Psychological health	5
Better communication	4

Reasons	value
Inpatience	133
Lackoftime	78
Tirechess	69
Nonchabit	52
Dailychare	35
Mental preception	31
Gingival sensitivity	29
Carelessness	6
Havingnopain	5
Havingnoencourager	5
Dental sensitivity	3
Expenses	2

Table 6. Reasons for no brushing in patients who did not brush

Table 7. The Results of Regression and Logistic Analysis: the Effectiveness of Knowledge, Age, Literacy, Family Size and Income Factors on Brushing

Variable	В	Standard error	P. Value	Exp(B)
Knowledge	0.8462	0.157	0.0000	2.33
Age	0.0658	0.045	0.146	1.06
Literacy	0.6775	0.471	0.150	1.96
Income	0.0017	0.006	0.760	1.001
Family size	0.0750	0.265	0.777	1.07
Constant	-13.72	2.777	0.000	

Chi square test indicated a significant relationship between income and compliance with brushing (P=0.045). The most important reasons for compliance with brushing were: prevention of tooth caries (178 points), prevention of halitosis (104 points), aesthetic aspects (54 points) (Table 5).

On the other hand the most important reasons for non compliance with brushing were: Impatience (133 points), lack of time (78 points) and tiredness (69 points) (Table 6).

Table 7 shows that among the effective variables in compliance with brushing; knowledge, age, education, income, and number of family members had more effect on compliance with oral hygiene.

More knowledge about oral health improves compliance with brushing up to 2.33 times.

Discussion

The results of the study indicated that the mean score of general knowledge about oral heath in compliant group was 1.3 times higher than non compliant group. The difference between two groups was statistically significant.

Different studies have considered the subject's knowledge is sometimes effective or some times ineffective. It has to be pertinent and specific to lead to satisfying result. Knowledge gives people decisionmaking power thus the foundation for informing a society has to be provided through lectures, practical expositions, group discussion programs and pamphlets (9, 10).

According to Green (11); Knowledge, inclinations, beliefs and values invoke people to choose a certain behavior.

The results of this study showed that 59.5% of the subjects in compliant group believed that oral heath affects heart heath while for non compliant group this was 40.5%.

Barker (12) asserted that appreciated sensitivity to problem significantly increased using the equipments that control oral diseases.

This study showed that the major reasons mentioned for compliance with brushing were the prevention of tooth caries and halitosis as well as aesthetic consideration. whereas the principle reasons for non compliance with brushing were impatience and lack of time in this group. This not only represents the lack of knowledge in non compliant group but also indicates that by taking psychological measures, values such as aesthetic aspect of the teeth and the importance of brushing in controlling halitosis have to be underlined in society. Carelessness and in difference are factors for non compliance with health recommendations and normally the only thing that eliminates this unfavorable manner is motivating people.

According to Davidson et al. (13) higher academic education would increase the knowledge about oral health.

Our results showed significant relationship between education and compliance with brushing. People have to be encouraged to increase their tooth brushing duration because it has a profound impact on brushing effectiveness and longer brushing is highly correlated to more effective plaque removal (14, 15).

Regarding the effectiveness of the oral health knowledge on compliance with brushing it is suggested those who do not brush divide in to two groups: 1) those that are illiterate, 2) the literate group, and both groups orient to appropriate health education programs. Also in order to increase the appreciated sensitivity toward oral health training of reference groups have to be considered first. Conclusion

The results showed that people in Azadshahr region of Yazd need organized oral hygiene instruction to improve oral health.

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Disturbed Root Development of Permanent Teeth after Radiotherapy

*Najmeh Anbiaee** Somayyeh Nemati *** Robab Anbiaee

*Department of Maxillofacial Radiology, Dental Research Center of Mashhad Dental School, Mashhad University of Medical Science, Mashhad, Iran.

** Department of Maxillofacial Radiology, Rasht University of Medical Science, Rasht, Iran. ***Department of Radiotherapy and Oncology, Beheshti University of Medical Science, Tehran, Iran.

Abstract

In this study, we have reported an uncommon sign in panoramic radiography of patient who had received ionizing radiation for rhabdomyosarcoma of the nasal fossa and the right ethmoid sinus, at fifteen years ego. The subsequent abnormal development of all maxillary permanent teeth is described and discussed as an uncommon effect of radiotherapy. Six months after referral to the department, the patient reported a painless swelling of the lower left side of mandible. Incisional biopsy confirmed the pleomorphic adenoma.

Key words: Complications; Radiotherapy; Root agenesis; Pleomorphic adenoma

Introduction

Due to tissue reactions to radiation, head and neck radiotherapy usually result in oral compilations affecting the salivary glands, oral mucosa, bone, masticatory musculature, and dentition (1). Irradiation of teeth with therapeutic dosage during their development period severely retards their growth.

If irradiation occurs pre-calcification, it may destroy the tooth bud whereas postcalcification irradiation may contribute to malformations and seize growth (2). Also, deficient dental root development has been reported after the conventional radiotherapy (3).

The effects of radiation therapy on the jaws may cause defects in the permanent dentition as follows: retarded root development, dwarfed teeth, or failure to form one or more teeth, delayed eruption of the permanent teeth, hypodontia, root stunting, enamel defects, bony hypoplasia, facial asymmetry, trismus, root agenesis,

Reprints Requests:Dr. Najmeh Anbiaee Dept of Maxillofacial Radiology Mashhad Dental School, Vakilabad Blvd Mashhad, Iran - 91735-984 Mobile: 00989153031510 Email: anbiaeen1@gmail.com microdontia, excessive caries, premature closure of apices (2, 4-8).

If radiotherapy occurs during the development, it may complete calcification sooner and cause premature eruption. Irradiation of teeth may retard or prevent root formation; however, the eruptive mechanism is resistant to radiation (2).

There are not sufficient reports regarding the effects of radiotherapy on the root formation in childhood. Therefore, the present study was performed to demonstrate an uncommon case with no developed roots in all his permanent teeth in the maxilla after radiotherapy.

Case report

A 20-year-old male referred to our radiology department for periapical radiography examination. He suffered from discoloration of the maxillary right second incisor without any other symptoms. In this radiograph, the roots of the maxillary right first and second incisors and canine were not evident.

After the radiography, no root was observed at the maxillary canine and incisors and the internal resorption was revealed in the second incisor. Figure 1. The panoramic view shows that all of the maxillary teeth are without roots but completely erupted



In the panoramic radiography all the maxillary permanent teeth were rootless and erupted completely. All the mandibular teeth erupted too and were completely intact with no impairment (Fig 1). None of the third molars were evident in the radiography of both jaws. In the clinical examination, apart from the maxillary right second incisor which was mobile and discolored, all of the maxillary teeth were fixed and did not have any pathologic symptoms.

In his medical history, at the age of 5, he had suffered from rhabdomyosarcoma of the nasal fossa and the right ethmoid sinus.

Figure 2. Lateral cephalogram, shows normally presenting primary teeth at the time of radiotherapy.



Figure 3. Posterior anterior skull view; note: the fullness of the ethmoid sinus because of the tumor.



At that time, he underwent external ethmoidectomy and then radiotherapy.

Total radiation dose was 4500 rad with cobalt in the fractional doses, in which 200 rad for 24 sessions administered during six months. The lateral cephalometry taken before radiotherapy revealed that the primary teeth were normally presented (Fig 2).

In the posterior-anterior skull view, fullness of the ethmoid sinus because of the tumor was evident (Fig 3).

Another interesting finding in this subject was submandibular gland pleomorphic adenoma which was diagnosed 6 months after referral to the department. The patient reported a painless swelling of the lower left side of mandible. Incisional biopsy confirmed the pleomorphic adenoma.

Discussion

Complications of the radiotherapy came as acute tissue reactions and late tissue reaction. Acute tissue reactions typically occur during treatment or a few months after and they generally resolve shortly after termination of the therapy. The late tissue reactions are defined in the literatures as occurring more than 90 days after the treatment (9).

Irradiation at the oral cavity may cause some side effects including xerostomia, ostomatopyrrosis, dysgeusia, mucous ulcerations, osteoradionecrosis, and high caries activity; malformation of teeth due to radiation therapy during tooth development is a relatively uncommon complication (10).

Furthermore, hypodontia, root stunting, enamel hypoplasia, delayed eruption of tooth, mobility, and tooth loss are another side effects of radiotherapy (4, 11, 12). Irradiated teeth with altered root formation still erupt (2). There are few reports regarding the effects of radiotherapy on children's dental structure.

Estiol C.L et al. observed the effects of radiotherapy on dentofacial development in 10 patients, who had the history of head and neck rhabdomyosacoma. In their study, bony hypoplasia and disturbance in root formation were the most common findings (5).

In our patient, all the maxillary teeth erupted without root and he was asymptomatic.

Gabris et al. (10) also reported a case in which, very sever root deformities in all the maxillary teeth were revealed. All of the teeth in their study were mobile; however, in our case apart from one, the rest of the maxillary teeth were fixed.

Katalin et al. (13) reported childhood dental complications after radiotherapy of tumors in the nasal cavity. Similar to our case, they reported no or hardly developed roots of permanent teeth in the maxilla.

In the Most studies have shown the root stunting although a few of them presented root agenesis. Different symptoms may be related to the amount of total radiation dosage or to the manner of radiotherapy.

Our subject received 4500 rad (45 Gy) Cobalt in the fractional doses (200 rad for 24 sessions); however, in the other studies the patient doses were not reported. Though in a study by Herrmann T. et al. 8-25 Gy radiation dosage was delivered to the patient and no root agenesis were evident (11).

In contrast to this study that all of the maxillary teeth but one were fixed, in the other reports tooth mobility was a common side effect of the radiotherapy ^{4, 10}. This may be related to the healthy periodontium and absent of major dental caries.

The absent of third molars in both jaws, may be due to the natural missing of these teeth or possibly related to the side effects of radiation in the early stages of buds development. It could be said that, the disturbed roots in this study were caused by the radiotherapy of patient at the age of 5. Also, the mechanism of eruption does not depend on the root existence and the radiation has not affected the eruptive mechanism and this finding is in agreement with references (2).

Regarding the fact that periodontal ligaments have an important role to play in tooth eruption, it may be assumed that radiation does not have any effects on the collagen ligaments (14).

All teeth in the mandible were intact and this finding might be related to the cobalt radiation therapy and the field of radiation.

Considering pleomorphic adenoma in this subject, it can be concluded that the patient is genetically susceptible to be affected by neoplasm. In addition, it probably was influenced by radiotherapy although this concept is not very well documented.

In conclusion, in the present case report, it could be assumed that radiotherapy has side effects on the root formation of all teeth in the children; however, it does not have any effects on the eruptive mechanism.

As all the mandibular teeth were intact and not influenced by radiation it could be concluded that the distance from radiation field is very important, or perhaps these teeth are less sensitive to radiation than the maxillary teeth.

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Apical sealing ability of root canal filling using two different tapered

accessory points

Mina Zarei, Maryam Javidi, Mehdi Lomee, Soheil Mir Hosseini, Mohammad Mortazavi

Department of Endodontics, Faculty of Dentistry and Dental Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

Abstract

The apical sealing ability of root canal fillings is an important issue for desirable outcome of treatment. The aim of this in-vitro study was to assess the apical microleakage of root canal obturation with MF and .02 tapered gutta-percha as accessory cones using lateral condensation., Fifty six extracted human anterior teeth with single, straight canals were randomly divided in to two experimental groups of 23 teeth each and two control groups of 5 teeth each. The teeth were instrumented with Race rotary Ni-Ti files to a master apical file of #30. Teeth in group 1 were obturated with 06 tapered master cone and 02 tapered gutta-percha as accessory cone with AH26 sealer using lateral condensation. Teeth in group 2 were obturated similarly, except MF gutta-percha was used as accessory cones. Positive control teeth were instrumented but not filled. Negative control teeth were instrumented, obturated and externally sealed. All the specimens were sectioned buccolingually and the maximum of leakage was measured using a stereomicroscope at 8X magnification. Data were analyzed using T-test and 0.1 mm accuracy. The positive and negative controls validated the testing model. There was significant differences between two groups. The average dye penetration in group 1 and group 2 were 3.5-12.5 and 1.75-10.5 mm, respectively., The most dye penetration was in group 1 and the lowest level of leakage was in group 2, which obturated laterally with 06 master cone and MF accessory gutta-percha.

Key words: 0.06 gutta-percha, standard gutta-percha, lateral condensation, microleakage

Introduction

Three-dimensional filling of the root canal system with gutta-percha and sealer is an aim of root canal treatment (1). Before this can be achieved, the root canal must be chemomechanically prepared to a sufficient shape and size to eradicate microorganisms and facilitate filling the root canal (2). Nearly %60 of endodontic failures is due to incomplete obturation (3). The purpose of obturation the root canal system is to prevent

Reprients Requests: Dr. Maryam Javidi Department of Endodontics, Faculty of Dentistry and Dental Research Center, Mashhad University of Medical Sciences, Mashhad, P.O. Box: 91735-984, Iran Tel:00985118829501 E-mail: Javidim@mums.ac.ir

leakage of bacteria and their products in to periradicular tissues and to seal within the root canal any irritants that cannot be fully removed (4). Lateral condensation technique is used by many clinicians throughout the world to fill root canals due to its simplicity and adaptability to most cases (5, 6). Lateral condensation technique does not create a homogeneous mass of gutta-percha, because a great number of cones are compacted against each other (7). There is a possibility of a high percentage of sealer in the apical region and poor adaptation to root canal walls (8). Recent advances in instrument design and materials have resulted in the development of nickel-titanium rotary instruments, with different tapers, sizes and blade design (9).

Recently, greater taper gutta-percha cones have been developed for use with rotary nickel-titanium file systems (10). It seems that filling with gutta-percha cones having the same taper with rotary nickel-titanium instruments may decrease the micro leakage (9). Many studies have been performed about efficiency and guality of root canal fillings using different master cones (4, 11). In 2001 Bal et al. demonstrated, the bacterial penetration between canals obturated with.06 tapered master cone and MF tapered accessory cones in one group with the other group filling with.02 tapered master cone and MF tapered accessory cones. They concluded that, there was a not significant difference between two groups (4). The purpose of this in vitro study was to evaluate the apical sealing ability of root canal filling when two different tapered gutta-percha MF and standard, as accessory cones were used.

Materials and Methods

Fifty six extracted fully developed human maxillary and mandibular anterior teeth with single, straight canals without cracks, caries and external resorption were selected. They divided randomly in to two experimental groups of 23 teeth each and two control groups of 5 teeth each. They stored in 5.25% Naocl for 1 hour and then immersed in saline until use. All teeth scaled with a periodontal scaler to remove soft tissue and calculus. The teeth were radiographed to confirm the presence of a single canal. After the teeth were decoronated to have a root length of 13 mm, the access cavity was prepared. The working length was determined by inserting a #10 K-file (Dentsply, Maillefer, Ballaigues, Switzerland) in to the canal until it was just visible at the apical foramen, then subtracting 1mm. The specimen instrumented using a crown-down technique with Race rotary nickel-titanium files (FKG, Switzerland) to a master apical file size of 30. Canal preparation sequences were in this manner:

1. Canal Pre-enlargment by Race #40/.10 and 35/.08 in the coronal 4 mm of canal

- Deep body shaping using Race #40, 35, 30, 25/.06
- 3. Apical preparation by 25/.06

The canals were irrigated between files with 2 ml of 5.25% Sodium hypochlorite. After the master apical file was reached, the smear laver was removed with 5 ml of 17% EDTA (pulp dent, USA) followed by a final flush of 5 ml of Sodium hypochlorite. After instrumentation was completed, the canals were dried with paper points (Roeko, langenau, Germany). A thin layer of AH26 sealer (Dentsply Detery, Konstanz, Germany) was applied to the preparation walls with a sterile paper point (Roeko, langenau, Germany). Teeth in group 1 were obturated with a.06 tapered master cone (Diadent group) and AH26 root canal sealer (Dentsply Detery, Konstanz, Germany) using lateral condensation of 02 tapered accessory cones (Diadent Group). Teeth in group 2 were filled using the same method as described above except medium-fine (MF) accessory cones (Caulk, Milford, DE) were used. Accessory cones were added to all specimens until the endodontic spreader (Union Broach, New York, NY, USA) no longer penetrated deeper than the coronal one-third of the canal. Then a heated instrument was used to sear the filling materials off at orifices and outta-percha condensed vertically with a #10 plugger (Hu-Friedy, Chicago, IL). After placing a restoration of glass-ionomer (GC America Inc. Alsip, IL, USA) all experimental and control teeth were srored in a humidor at 98.F and 100% humidity for 72 hours to allow the sealer to set completely.

In group 1 and 2, the whole length except for the apical 2mm was covered by two layer of nail polish. The negative control teeth (five teeth) were instrumented, obturated with.06 tapered master cone and.02 tapered and MF accessory cones and the whole length of the roots were covered by two layers of clear nail polish. The five teeth that instrumented and obturated with only a.06 tapered master cone as a single cone were used as positive controls. In this group the surface of the roots was not covered by nail polish. All specimens were passively immersed in Indian ink for 72 hours and then rinsed with running water for 1 hour. Grooves were made along the mesial and distal external surfaces of the root using a diamond disc and the roots were longitudinally splitted. The larger amount of linear leakage of dye in two split root segment was blindly measured at 8X magnification under optical stereomicroscope (Blue light, XTD series, USA) with 0.1 mm accuracy by three evaluators. To determine whether there was a significant difference in dye penetration, a two sample independent T-test was used. A p-value of 0.05 was regarded as significant.

Results

The positive controls demonstrated completely dye penetration showing the efficacy of root canal sealer in apical seal.

Group	N	Range	Minim	Maxim	Mean	Std.	Variance
						Deviation	
Standard	23	9.0	3.5	12.5	6.66	2.04	4.194
Count	23						
MF	23	8.7	1.7	10.00	4.8952	1.6829	2.826
Count	23						

Table 1: Mean leakage and SD in experimental and control groups

The negative controls did not leak for the entire observation period indicates that nail polish produced a tight seal and the leakage was only through the apex, thus validating the testing model. The results of experimental groups have been shown in figure 1. Between experimental groups, the most leakage was in group 1 that obturated laterally with standard gutta-percha (.06 master cone .02 accessory cone) (P=0.002). Group 2 which obturated laterally with.06 master cone with MF accessory cones showed the lowest leakage. According to the results, the mean leakage in group 2 (4/89 mm) was significantly less than group 1(6/ 66 mm). (Table 1)

Discussion

Cold lateral condensation of gutta-percha is the most widely used technique for root canal obturation (5). However, to date, studies are lacking on the effectiveness of this technique in obturating canals prepared with Ni-Ti rotary instruments. These instruments have been developed in order to fewer instruments errors because of their unique physical properties (12). In order to provide a more uniform root canal shape with a predictable taper in the apical region, the use of rotary Ni-Ti instruments were deemed necessary (13). Therefore Race Ni-Ti rotary files as one of the most routinely used files were used in this study for canal preparation (14). Obturation of canals prepared with rotary Ni-Ti files maybe achived using a variety of thermoplastisized or lateral condensation techniques (4). Now, master cones are available in different taperes, matching the canals which prepared with.04 and.06 rotary Ni-Ti instruments (9).

Many studies have compared sealing ability of lateral condensation technique with other obturation methods (9, 15, 16). Most authors assess obturation quality by determining the amount of apical or coronal microleakage. Sealing of the apical third was critical to achieve high success rates in root canal treatment, led us to choose this part of the canal for evaluation (17). In lateral condensation technique numerous accessory cones are used to obliterate the space between master cone and canal walls. It is confirmed that gutta-percha does not provide an apical seal without using a root canal sealer (18, 19). Microleakage occurs along the interface between dentin and gutta-percha, dentin and sealer or gutta-percha and sealer (20). It may be through the mass of the sealer (21) but does not occur through the solid mass of gutta-percha (22).

Some studies showed that epoxy resinbased sealers have low shrinkage during setting and more dimensional stability than the others, so we used AH26 sealer in this study (23,24). De moor and De Boever studied on long term sealing ability of AH plus and AH26 root canal sealers in conjunction to different obturation technique. They concluded that all lateral condensation, Hybrid and Thermafil techniques showed dye penetration (25).

In this study, the apical sealing ability of two different accessory cones in root canal filling was compared. The method for evaluating obturation guality in this study was dye penetration along the surface of gutta-percha and canal walls. The results of this study demonstrated that canals obturated with.02 tapered accessory cones resulted in lower apical seal, compared to MF accessory ones. However, the master cones were similar and was.06 tapered gutta-percha in both groups. In this study the dye penetration occurred within AH26 root canal sealer. These findings may be explained by the results of Gound study that showed canal fillings with Fine accessory cones were heavier than those obturated

Fig 1: Mean leakage in two experimental groups



with MF or size 25 accessory cones (26). Hembrough et al, found less accessory cones required, when a master cone is used that matches the tapering of rotary instruments in canal preparation (27).

Allison et al, reported that insertion of a spreader tip within 1 mm of the working length resulted in better apical seal (28). As Wilson explained that greater taper of cones decrease the spreader penetration depth (29), we can conclude that more amount of microleakage was seen in group 1 that obturated with.02 tapered accessory cones in contrast to group 2 that obturated with MF accessory cones. Al-Hadlaq and Al-Rabiah evaluated the ability of.06 taper standardized, non- standardized MF guttapercha points and 02 taper master cone, using system B or lateral condensation to seal root canals prepared with 06 taper rotary instruments. They concluded that apical microleakage was significantly less in MF gutta-percha obturated canals (30).

In the present study, there was a significant differences in apical microleakage between group 1 and 2 (P < 0.05). However the mean leakage was less in canals filled with non- standardized MF gutta-percha as accessory cone than in those obturated with standardized.02 tapered gutta-percha, attributable to the lesser mass of obturation material in the standard group.

The teeth evaluated in this model were straight with single canals that would be

prepared simply with rotary Ni-Ti instruments. Although root posterior teeth have curves, isthmuses and fins. Further investigation is necessary to evaluate whether obturating these complex roots with standardized or conventional gutta-percha cones will result in an acceptable seal. Also the use of different tapered standard and conventional gutta-percha points for canal obturation, both in vitro and clinically, is suggested.

Conclusion

Under the condition of this study, canals obturated with.06 tapered master cone and MF accessory cones with lateral condensation technique showed less apical microleakage than those obturated with.06 tapered master cone and .02 tapered accessory cones.

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Osteolipoma in the floor of the mouth: report of a case

*Raahpeyma A,**Saghravanian N, ***Khajehahmadi S *Department of Oral & Maxillofacial Surgery, Dental faculty, Mashhad University of Medical Sciences, Mashhad, Iran, **Department of Oral & Maxillofacial Pathology, Dental faculty, Mashhad University of Medical Sciences, Mashhad, Iran,***Department of Oral & Maxillofacial Pathology, Dental faculty, Mashhad University of Medical Sciences, Mashhad, Iran

Abstract

Lipoma is a benign soft tissue tumor of fat and consider as the most mesenchymal neoplasm which highly occurrence on the trunk and extremities. It's prevalence in oral and oropharyngeal region is relatively uncommon. Few oral cavity lesions occur before the third decades of life with a fairly balanced sex distribution. Lipoma histopathologically sub classified to fibrolipoma, angiolipoma, myxolipoma myolipoma and osteolipoma according to presence of fibrotic connective tissue, highly vascular, myxoid changes, smooth muscle bundles and area of bone or cartilage metaplasia just close to mature fat cells.,Osteolipoma is a rare variant of lipoma that had mature fat cells as main tissue with area of bony changes. In head and neck region osteolipoma has been reported in CNS, neck, scalp and lat pharyngeal space., In review of English language articles there was eight reported case of osteolipoma in oral cavity.,Our case is an osteolipoma of the floor of mouth in 54 years old age woman with submental mass from 6 months ago and radiographic report suggests teratoma with some radiopaque nests.

Key words: Oral cavity, Tumor, Osteolipoma

Introduction

Lipoma is a benign soft tissue tumor of adipose tissue. Five percent of benign tumors and 50%-25% soft tissue tumors are lipoma (1). It's prevalence in oral cavity as a true mesenchymal neoplasm is low. Lipoma classified to fibrolipoma, angiolipoma, myxolipoma myolipoma and osteolipoma. They have mature fat cells with these characteristics in order:

Fibrotic connective tissue, highly vascular, myxoid changes, smooth muscle bundles and area of bone or cartilage metaplasia (2). Osteolipoma is a rare variant of lipoma that had mature fat cells as main tissue with area of Bony changes. In head and neck region osteolipoma has been reported in CNS (hypothalamus, tuber cinevum, suprasellar

Reprints requests:Dr. Nasrollah Saghravanian Department of Oral Pathology, Mashhad Dental School, Vakilabad Blv, Mashhad, Iran, P.O.Box:91735-984, Email: saghravaniann@mums.ac.ir area), neck, scalp and lat pharyngeal space (3-8).

In review of English language articles there was eight reported case of osteolipoma in oral cavity (9-11). Four lesions happened in females. Our case is an osteolipoma of floor of the mouth in 54 years old age woman.

Case Report

Patient was 54 years old age woman without any systemic problem. She had noticed submental mass 6 month ago. She was referred to the authors with an occlusal graph with diagnosis of salivary gland stone.

There was no submental mass in extraoral examination and in intraoral examination lesion had caused elevation of floor of mouth (Fig 1). Overlying mucosa was normal and similar to adjacent mucosa in color. It's consistency in palpation was soft. Milking of salivary gland's expressed normal saliva flow from ducts. She had no pain or limitation in mouth opening. In CT scan there was a lesion in medial of mandibular body without adherence to the bone. It contains two radiopaque nests in the lesion (Fig 2).

CT contrast of the lesion was similar to the fatty tissue.

Radiographic report suggests teratoma. Under local anesthesia with incision located lateral to the sublingual ducts accessed to the lesion. Yellowish color of the lesion and superficial red blood vessels in capsule guide toward lipoma and another experience of the author with osteolipoma⁹ suggest osteolipoma as a clinical diagnosis (Fig 3). It's adherence to surrounding tissue was loose except in sublingual gland region. We remove this salivary gland with lesion.

Figure 1: Soft tissue mass with elevation of tongue in intraoral examination.



Histologically, it consists of well circumscribed mass of mature fat cells with osseous trabeculation contain osteocytic lacunar spaces (Fig 4).

In post operative course patient developed lingual and sublingual hematoma that caused tongue elevation. Seven days after operation tongue was normal in color and size. Follow up of the patient six months after surgery revealed no sign of recurrence.

Discussion

Lipoma is the most common mesenchymal neoplasm. Some cases of herniated and epithelialized buccal fat pad in oral cavity have been reported as pseudolipoma (12). The lipoma of oral cavity is rare and osteolipoma variant in oral cavity is



Figure 2: Well defined radiolucency with focal radiodense body (arrow).

extremely rare. In English language articles, eight cases of oral osteolipoma have been reported. With our case there are five cases in buccal and vestibular regions, one in lateral border of tongue, one in congenital cleft Palate and two others in sublingual area (9-11).

Dominant theory for presence of mature bone in lipoma is differentiation of undifferentiated mesenchymal cells to the bone forming cells (osteoblasts). This change can be metaplastic or neoplastic (13).

In previous reported sublingual osteolipoma by godbr in 1961 in a male patient there was adherence of the lesion to the genial tubercle periosteum (14). In our case there was no adherence to the bone.

Overlying covering mucosa was normal and this thin mucosa faded yellow color of lipoma. Figure 3: Excised gross of yellowish specimen with a pointed head of calcified mass at the peripheral left side.



Figure 4: Matured lacunar bone just close to the adipocytes and small fibrous connective tissue.



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Early onset oral squamous cell carcinoma: Report of a case and Review of the literature

*Amirchaghmaghi M,**Mosannen Mozafari P,***Tonkaboni A,***Zare Mahmoodabadi R,***Ghazvini K

*Assistant Professor of Oral Medicine, Oral Medicine Department of Dental Faculty, Mashhad University of Medical Sciences, Mashhad, Iran, *Postgraduate student of Oral Medicine, Oral Medicine Department of Dental Faculty, Mashhad University of Medical Sciences, Mashhad, Iran, **Assistant Professor of Oral Pathology, Oral pathology Department of Dental Faculty, Mashhad University of Medical Sciences, Mashhad, Iran, ***Assistant Professor, Microbiology and Virology Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

Abstract

Recently increased frequency of early onset squamous cell carcinoma (EOSCC) in young patients has been detected. Classic risk factors such as smoking and alcohol consumption are not related to EOSCC. We report a case of EOSCC with no identifiable definite risk factor.

A 32-year-old man with compliant of severe radiating pain and an ulcerated mass,1.5 X 2cm in size, was referred to oral medicine department of Mashhad dental faculty .the surface of the lesion was granular and indurated margins were evident. The patient was from a high socioeconomic group with no history of smoking or alcohol consumption, drug abuse or unusual sexual habit. The only probable risk factor was low content of fresh fruits and vegetables in dietary program. The diagnosis of squamous cell carcinoma was designated and confirmed by histopathologic examination. None of tested viruses (Human Papilloma Virus (HPV) 16, 18, Epstein Bar Virus (EBV), Cytomegalovirus (CMV), Human Herpes Virus (HSV)) were found by PCR. It seems that EOSCC has different clinical and demographic characteristics that necessitate further studies in different populations.

Key words: oral cancer, squamous cell carcinoma, young patient, case report

Introduction

Oral squamous cell carcinoma (OSCC) is the 8th most common malignancy which represents more than 90% of all head and neck cancers throughout the world (1, 2).

Usual risk factors are smoking and alcohol consumption and other possible etiological agents are viral infections, sexual practice, diet, anemia, drug abuse, immunosupression and radiation (3-7).

Reprints Requests:Dr. Amirchaghmaghi M Oral Medicine Department MashhadDental faculty, Vakilabad BLVD Azadi SQR,Mashhad, P.O.Box:91735, Iran Tel: 0098 511 8829501-15 E-mail: Mosannenp@mums.aqc.ir Recently, increased frequency of early onset OSCC (EOSCC) in young patients with altered demographic features and risk factors such as reduced exposure to traditional risk factors, involvement of tongue and posterior oral region and association with different viruses (Human Papilloma Virus (HPV) 16, 18, Epstein Bar Virus (EBV), Cytomegalovirus (CMV), Human Herpes Virus(HSV)) has been described (2,8-10). There are several studies about increased incidence and different demographic, etiologic, clinical and histopathological features of EOSCC (3,6,7,9,11-14).

Here, we report one case of EOSCC of tongue in a young male with no identifiable definite risk factor.



Case report

A 32-year-old man with complaint of severe radiating pain associated with a tongue ulcer (with three months duration) was referred to Oral Medicine Department of Mashhad Dental Faculty in Apr 2009.

In extraoral examination no abnormal asymmetry findings such as or lymphadenopathy was observed. In intraoral examination an ulcerated mass with 2×1.5 cm size, was observed on the right lateral border of tongue in anterior two thirds (Fig 1). The lesion was firm on palpation with a granular surface. Indurated margins especially in anterior aspect were notified. No local source of trauma was evident in the area. The patient reported a suddenly onset pain, before seeking medical care, leading to awareness of a small ulcer. The patient had considered the ulcer as aphtea and had not sought care. Medical history was not contributory and the patient was healthy and denied any tobacco, alcohol or drug abuse. In social history no high risk behavior (such as oral sex habits, homo or heterosexuality) was determined and he was from a high socioeconomic group. Anemia was ruled out by hematological assessment and dietary analysis showed low consumption of fresh vegetables and fruit (less than 1 portion daily during 5 years ago).

Provisional diagnosis of EOSCC was assumed and biopsy was performed. In histopathologic examination ilands and strands of squamous epithelium was invading the lamina propria, malignant call showed changes such as cellular and nuclear pleomorphism ,hyperchromatism ,anormall mitosis,and keratin pearl formation.. A well differentiated squamous cell carcinoma was diagnosed (Fig 2). Due to possible viral etiology Polymerase Chain Reaction (PCR) was performed for detection of HPV 16, 18, HSV, EBV and CMV and the results were all negative.

Patient was referred to oncologist. The treatment consisted of hemiglossectomy and unilateral radical neck dissection. After surgery, treatment was followed by radiation therapy given six weeks post operatively. Six months follow up did not show any recurrence or metastasis.

Discussion

OSCC classically affects patients older than 45 years old (12) but recently an increased incidence of OSCC in young patients (EOSCC) has been noted (3, 6, 11, 12).it seems that traditional risk factors (such as alcohol and tobacco) are of little significance in this age group of patients (1, 2, 6, 8). In our patient major risk factors were absent and less documented risk factors were investigated. The patient was approached

by hematologist for anemia and no evidence was revealed. Dietary analysis showed less than one daily portion vegetables and fresh fruit consumption by the patient. Nutritional deficiencies may predispose one to early carcinogenesis. Some studies confirmed that a diet rich in fresh fruits and vegetables gives protection against cancer (3,15). In addition iron deficient animals were more prone to tongue tumors (4, 6, and 9). In our patient, site of lesion was anterior two third of **Fig 2**



tongue which is reported as the most common site of EOSCC followed by the floor of the mouth (4, 6, 13, 16, 17). In histopathological examination, the neoplasm was well differentiated (grade 1) similar to many studies that showed such a finding in EOSCC (20,21).

Fortunately in most studies, prognosis of EOSCC is better than OSCC of older adults (9,11), while some of the studies suggest more aggressive behavior for it (4,22). In our case ,a good prognosis was anticipated due to well differentiated histopathologic profile.

No evidence of metastasis or recurrence was detected after six months follow up, although longer evaluation is desirable. The reason for the development of SCC of head and neck in young patients without typical risk factors remain unclear, but because of the worldwide reports of increasing numbers of young people developing this disease, it is of paramount importance that we continue effort for identifying a causative agent for development of EOSCC of the head and neck in younger populations. There is one study in Brazilians which has revealed similar demographic patterns and risk factors profile in EOSCC and SCC on older adult. In this survey EOSCC was more common in male, smoker/drinker young patients, with floor of the mouth as the most common site of involvement. Half of lesions were moderately differentiated (12) .These debates may be due to ethnic or life style differences.

In our patient pain was the first annoying symptom leading to self examination of the tongue by patient. Interestingly severe pain is a common symptom in EOSCC (6) where as SCC in older patients has an insidious symptomless behavior.

Conclusion

Many dentists simply do not consider OSCC in differential diagnosis of oral lesions in young patients because of this traditional belief that OSCC is a disease of old patients. This case along with similar reports highlights the importance of proper clinical examination and diagnosis, apart from traditional beliefs.

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Saliva as a mirror image of whole body: A review and our experience

*Balwant Rai, **Jasdeep Kaur

*MS (Forensic Odontology), P.G (Std.Medical Imaging, Health and Safety Officer, Crew-78, MDRS, USA, School of Dentistry, Oral Pathology and Maxillofacial Surgery, ** BDS, MS (std Forensic Odontology School of Dentistry, Oral Pathology and Maxillofacial Surgery

Abstract

There have been increasing numbers of applications using saliva, as the target substrate for performing clinical diagnostic tests. These have focused primarily on point-of-care testing. These point of care testing approaches range from, for example, currently available, highly specialized screening tests for the presence of antibodies recognizing HIV to the potential development of "lab-on-achip" platforms. Sampling of saliva is advantageous, since non-invasive, stress free, easy and frequent collections are possible. Apart from acting as first time of defence against foreign pathogenic, it also constantly cleanse and lubricate the oral cavity. Number of biochemical, immunological, toxicological and microbiological analysis are possible in saliva and importance of oral tissues evaluation and neoplasm screening how long been established also, saliva is routinely referenced in forensic odontology and toxicology especially in drug abuse and alcoholism. This can become a non-invasive alternative to blood & urine test, for early disease detection and management in future.

Key words Saliva, clinical diagnostic test, lab on chip

Introduction

Whole saliva is a combination of gingival crevicular fluid, which has a composition similar to serum, and fluid released from salivary glands, of which the parotid, submandibular and sublingual are the three major sources.¹ The components of saliva are water, proteins, electrolytes, organic molecules secreted from salivary glands, blood, microbes, epithelial lining cells, extrensic factors (food, mouth rinse, tooth paste) and additional fluids (Fig. 1).

Mouth is one of the best laboratories the body to study issues in human biology that go beyond dental research.

- I. Physiology & Biochemical Aspects
- 1. Physiology

Reprints Requests: Dr. Balwant Rai, MS Forensic Odontology

P.G. Std. Medical Imaging, Health and Safety Officer, Crew-78, MDRS, USA E-mail: drbalwantraissct@rediffmail.com (a) Salivary secretions:

Saliva is a complex oral fluid consisting of a mixture of secretions from both major salivary glands as well as minor glands of oral mucosa. Once saliva passes through the ducts and enters the oral cavity, it mixes with blood cells, microorganisms and microbial products, oral epithelial cells and cell products, food debries and upper airway secretions.

The human salivary glands produce about 600 ml/day of serious and mucinous saliva containing minerals, electrolytes, buffers, enzymes and enzyme inhibitors, growth factors and cytokines, immuno globulines mucins and other glycoproteins.²⁻⁵ Proteins that are found in saliva such as lactoferrin, lysozyme, peroxidase, defensins and histatins, can destroy or inhibit the growth of microorganisms in oral cavity⁶. The components of saliva act as a "mirror of the body's health" and there is growing acceptability of saliva as diagnostic tool.

(b) Composition:



Table

Organic components of saliva	
Amylase	
Lactoperoxidase	
Kallikrein	
Lactoferrin	
Growth factors: Nerve growth factor	
Epidermal growth factor	

pH 6.4 – 7.1

alkaline, viscous secretion

Water content 99.5%

Solid content 0.5%

Organic constituents -

60% organic constituents

Solids

40% inorganic constituents

* mucin

* enzymes Amylase, lysozyme

* albumin & globulin

* others

Urea, uric acid, cholesterol, vitamins, phospholipids

MVCIN

It gives viscosity to saliva, mucin is a glycoprotein, insoluble in water of dilute acid.

Microscopy of saliva reveals Epithelial cells Microbes Salivary corpuscles acteria

The average content	of	vitamins	in	saliva	are
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Vitamin	Average content (y/ml)
Thiamin	0.007
Riboflavin	0.05
Niacin	0.03
Pyridoxine	0.6
Pantothenic acid	0.08
Folic acid	0.0001
Biotin	0.0008
Ascorbic acid	2.4
Vitamin K	0.015

(WBCS) fungi mucus food debris protozoa

Salivary composition depends many factors: stimulation, diet, age, time of day, disease etc.

Ordinary saliva varies weakly alkaline to weakly acid, the pH ranging approximately 6.0-7.9 with optimum pH of 6.6. Lower pH values occur more frequently among caries susceptible individuals and dental erosion is often accompanied by greatly increased total salivary acidity.

Saliva is a dilute secretion with specific gravity of 10007 normal saliva contains glucose. Potassium, thiocyanate is present in saliva and cyanate may possibly come from ingested cyamides present in certain fruits, in tobacco smoke and from breaking down of proteinmaterial. Apoerythein, a protein fraction that protects vitamin B_{12} from digestive destruction is also present in saliva.

Secretion of saliva is governed by central nervous system along with sympathetic

nervous system. No hormone mechanism in salivary secretion isknonts. Ordinarily the secretion of saliva is the result of reflex stimulation of secretary nerves the ough a centre in medulla oblongata, pschic stimuli, brought about by suchinfluences as thought of food, also stimulate its secretion.

The amount of saliva secreted by an adult in 24 hours varies between 1000 and 1500 ml³. In the absence of obvious external stimuli, the rate of salivary secretion in adult is between 0.1 ml and 0.25 ml per minute and values < 0.1 ml/min should be considered abnormal. The stimulate flow rate varies between 1-2 ml/min and values < 0.5 ml/min should be considered abnormal.³

Saliva is routinely categorized as resting (unstimulate) or stimulated.^{3,8} The resting saliva reflects the basal flow rate and it is present in our mouths coating the oral tissues about 14 hours of the day. Stimulated saliva

Secretion rate1	Normal values	Gland secreting
	(ml/min)	
Resting saliva	0.1-0.25	Sub mandibular/sublingual glands (70%)
		Parotid (15-20%)
		Minor salivary glands (58%)
Stimulate saliva	1-3	Parotid (45-50%)
		Submandibular/sublingual (4550%)
		Rest minorsalivary glands

is also protective and is present in our mouths for upto about 2 hours of the day.

Regulation of salivary gland secretions

The control of salivary secretion is exclusively neural. The flow rate of saliva during sleep is small. This spontaneous secretion keeps mucous membrane moist. Stimulated secretion occurs via nervous reflexes. Neural mechano receptors and chemo receptors in the oral cavity respond to dryness of mucosa, chewing chemicals in the food and texture of the food. Afferent impulses are integrated in medulla (salivary center) and salivary center receives inputs from cortex, amygdala and hypothalamus.

Salivary gland secretion may be inhibited temporarily with infections or drugs (anti cholinergic drugs). Permanent inhibition occurs in irradiation of head & neck, Sjogren's syndrome and is primarily associated with alimentary functions of saliva.

Causes of decreased salivary secretion

1. Water loss / dehydration

(a) non-renal loss:

reduced intake

increased loss: fever sweating, burns vomiting

blood loss

(b)renal los diabetes insipidus (lack of ADH) diabetes mellitus (osmotic diversies) drugs (diveretics)

2. Salivary gland hypofunction

(a)Damage -irradiation

-age

-antoimmune disease:

rheumatoid, S/oqren's, SLE

sarcoidosis

(b) neural dysfunction

-autonomic neuropath

- -Alzheimer's
- -psychoqenic
- 2. Biochemical aspects

Salivary Anti-oxidants (AOX)

AOX are present in all body fluids and tissues and protect against endogenously formed free radicals, usually produced by the electron transport system.⁹ AOX enzymes such as superoxide dismutase (SOD) and glutathione peroxidase (GSHPx) provide protection with in cells while lowmolecular weight scavenging AOX are present in extracellular fluid. These include

Constituent	Normal range
Ph	6.0 – 7.9
Ammonia	2-10 mg/dl
Calcium	4 – 8 mg/dl
Inorganic phosphate	10-25 mg/dl
Chloride	30-60 mg/dl
Carbonate	20-45 mg/dl
Protein	200-400 mg/dl
Cholesterol	2.5 – 9.0 mg/dl
Lipids	0.05 - 0.20 mg/dl

ascorbic acid, a-tocop herol¹⁰⁻¹⁴ and spcarotene¹⁵⁻¹⁸. In addition, distary derived components such as uric acid, non-protein thiols and glutathione also act as AOX¹⁹⁻²¹ as does albumin formed in plasma and saliva.²²

Uric acid appears to be the dominant AOX present in saliva and displays a concentration similar to that of serum salivary. Ascorbic acid and albumin concentrations are lower than that of serum^{11,22}, stimulated saliva contains a lower concentration of AOX but when flow rates are taken into account, AOX capacity is higher than in unstimulated saliva.¹¹ Saliva an prove to be an excellent medium for monitoring AOX status and oxidative stress in future.

Saliva: Sample Collection, Preservation and Pretreatment for Analytical Techniques^{1,11,21,23}

Saliva is ultra filtrate of plasma. In a clinic or lab, saliva is relatively easy to collect in sufficient quantities for analysis and the costs of storage and shipping tend to be lower than those for serum and urine. Saliva is easy to obtain, with less invasion of privacy and ease of adulteration, compared with urine.

Salivary sampling protocols are advantageous as they make for frequent and easy collection of samples by non-invasive NEEDLE-FREE stress free techniques. This is especially useful in endocrinology because serial measurement of hormone levels and their diurnal variation is simplified with ease of collecting saliva.

Saliva can be used as an aid in diagnosis of a wide variety of oral and non oral diseases. But all things are not equal.

Advantages

- 1. Saliva measures free, bio available fraction of steroid hormones that have moved out of bloodstream and into the tissue. (Blood & urine measure the total levels)
- 2. Most reliable measurement of tissue uptake in case of topical hormone supplement.
- 3. Painless, non-invasive, needle free.

- 4. Private, convenient for both patient and doctor.
- 5. Hormones are stable at room temperature for weeks, so can be shipped worldwide easily.
- 6. Transport of saliva samples to laboratory requires no special handling.
- 7. Less expensive than conventional blood testing.
- Ease of collection allows for routine monitoring and adjustment of hormone supplement if required.

Drawbacks of use of saliva as diagnostic fluid:

- Most diseases are diagnosed in the blood and usually the concentration of substances tested are higher in blood than in saliva.
- 2. Physicians know little about saliva and are understandably reluctant to use it as a diagnostic fluid.
- 3. Dentists are not overly concerned about salivary findings in systemic diseases.
- 4. Clinical laboratories are now automated with settings on their machines for blood and urine. Setting them up for saliva will be required.

For health care professionals and scientists, saliva tests are safer than blood tests, which are more likely to result in exposure to HIV or hepatitis. For the patient, from invasive collection techniques for saliva can dramatically reduce anxiety and discomfort, thereby simplifying collection of serial samples for monitoring general health and disease states over time.

Different techniques have been devised for the collection of saliva.

Usually, an individual is asked to rinse out his mouth with water and then chew an inert material such as a piece of rubber or paraffin was from 30 seconds to several minutes. The first mouthful of saliva is discarded; there after the saliva is collected into a small glass bottle.

- 1. Also saliva can be absorbed onto a swab.
- 2. Non invasive home testing of saliva : saliva testing kits are available.
- 3. Or collection of specific gland saliva.
- 4. In case of edentulous patient 2% citric acid is employed to obtain stimulated saliva.

Saliva collection device available

Salivette, omnisal, orasure

Saliva is allowed to pool in the bottom of the mouth and collected into a plastic vial centrifuged at 3000 rpm for 510 minutes and supernatant fraction is stored at -20°C or -80°C until analyzed.,

Spit kit: Patient should contain :

- 1. Plastic disposable tray to collect saliva
- 2. Standardized price of paraffin wax or unflavoured sugarless chewing gum
- 3. pH paper
- 4. strip to assess buffer capacity of saliva
- 5. dipslide for microbiological test

Other requirements: Measuring device, incubator

Preservation for cortisol:

Quick freeze them on collection with tharving and centrifugation, glycoproteins in saliva ppt out, learning behind a pipetlable clear fluid.

Collection of saliva may be difficult from individuals who experience:

- 1. anti cholinergic symptomatology (tricyclic antidepressant overdosage.
- 2. Icoholics.

Salivary function tests:

They may vary from simple screening tests which may be performed easily in clinics to more complex ones to be done in central labs.

Screening tests: Sialometry pH measurement Buffer capacity

Clinical condition	Analyte
Digitalis toxicity	Ca, K
Affective disorders	PG
Immuno deficiency	IgA
Stomatitis in chemotherapy	Albumin
Cigarette usage	Cotinine
Gastric cancer	Mitrate, mitrite
Forensic	Blood group antigens
Infections : subella,measles, mumps	Ab
Celiac disease	Anti IgA gliadin
Liver function	Caffeine clearance
Autoimmune diseases	Anti SS-A/RO Ab, anti SSB/ La Ab
HIV infection	Ab detection
Hepatitis A, B	Ab detection
Drug abuse	Drug testing

Table: TDM in Saliva

Antipyrine	Penicillin
Carbamazepine	Procanamide
Cortisol	Prilocaine
Digoxin	Progesterone
Sestriol	Testosterone
Ethanol	Theophylline
Lithium	
Methadone	
Metoprolol	

Microbiologic dipslide tests:

Lactobacilli

Strep mutans

yeast

- Special tests:
- Sialochemical
- Microbiological,
- Immunological
- Table: Areas using saliva as a diagnostic tool
 - Virology
 - Immunology
 - Microbiology
 - Endocrinology
 - Epidemiology
 - Forensic
 - **Biochemistry**
 - Salivary assays currently available^{23,24}
 - Assays

Ab to viruses, bacteria

- *HIV
- *Hepatitis A&B
- Unconjugated steroid hormones:
 - Estrogen
 - Testosterine
 - Progesterone
 - Free cortisol
- Environmental toxins:
 - Cd
 - pb
 - Hg
- Tobacco: Cotinine

Drugs:

- Ethanol
- Theophylline
- Lithium
- PCR to detect viruses: herpes Bacteria: H.pylori
- Tumour marker:

c-erb B-2 in breast cancer (prognostic indicator)

Target population:

1. To identify hormone imbalances:

Deficiency or excess: in case of, menopause and ropaese reproductive disorder chronic illness diseases of aging

- 2. To identify tumor markers
- 3. to diagnose and monitor disease progression:
 - Alzheimer's disease
 - Sjogren's syndrome
 - Cystic fibroses

Diabetes

- 4. Research possibilities beyond oral and systemic diseases in areas of:
- · Genetic defects
- · Mitritional status
- · Age specific changes
 - Salivary markers of systemic disease -
 - 1. Hereditary diseases:

Celiac disease : Celiac disease is a congenital disorder of small intestine involving malabsorption of gluten. Serum IgA antigiadin antibodies (AGA) are increased in the condition. Measurement of salivary IgA-AGA has been reported to be a sensitive and specific method for screening of disease and monitoring patient compliance of required glutin free diet.²⁵

(b) Congenital renal hyperplasia: Due to 21a-hydroxylase deficiency. Early morning salivary levels of 17 hdroxyprogestenine (17-OHP) has been reported to be an excellent screening test for the diagnosis and accuratel reflect the serum levels.²⁶

(c) Cystic fibrosis (CF): Elevated levels of calcium and proteins in submandibular saliva is observed in these patients. Elevated sodium levels in minor salivary glands are reported in CF patient.²⁷

2. Autoimmune syndrome

Sjogren's syndrome:

Anti SS-A / Ro and anti SS-B/La antibodies are also present in saliva and a high correlation between presence of these antibodies in whole saliva and serum has been reported.²⁸

3. Infection diseases

(a) Shigellosis – Evaluation of secretary immune response in saliva of children infected with Shigella revealed higher titres of antilipoly saccharide, anti-shiga toxin antibody²⁹. Salivary levels of these immunoglobulins have been suggested to be of use in monitoring the disease.

(b) Pigeon breader's disease – Om interstitial disease induced by exposure to antigens derived from pigeons and measurement of salivary IgG against these antigens can help in evaluation of these patients.³⁰

(c) H.pylori infection – It is associated with gastutis, peptic ulcers and possibly stomach cancer. Onset and severity of disease can be determined by monitoring IgG antibodies against this bacterium in saliva and oral cavity.³¹ also, polymerase chain reaction (PCR) can aid in its detection.³²

(d) Pneumococcal pheumonia – Detection of pneumococcal polysaccharide in saliva by ELISA offers or valuable complement to conventional diagnostic methods.³³

(e) Lyme disease – Detection of anti-tick antibody in saliva has a potential as a biological marker of exposure to tick bites and a screening method.³⁴

4. Malignancy

Salivary analysis may aid in early detection of certain malignant tumors.

5. Viral diseases

A number of studies have now shown that antibodies to viral infections can be detected in saliva eg. HIV, hepatitis A & B, subella virus, measles rota virus, and mumps.^{35,36}

PCR based virus detection is a useful method for early detection of herpes simplex virus. Anti dengue IgM4IgG levels in saliva have demonstrated sensitivity of 92% and specificity of 100% in diagnosis.³⁷

Saliva assay	Diagnostic role in
p53 antibody	Oral squamous cell carcinoma
Defensins-I	Oral squamous cell carcinoma
c-erb B-2	Breast cancer early detection & follow up screening
CA15-3	Breast cancer early detection & follow up screening

Table: Diagnostic tumor markers in saliva

6. Hormone levels

In endocrinology, the ease of collecting saliva is simplifying serial measurements of hormone levels and their diurnal variation eg. salivary free cortisol assay is a valid indicator of cortisol concentration in serum and is not dependent on salivary flow rate³⁸ is saliva estradiol – has been formed to

predict preterm labour³⁹. Home-estradiol kits are available for women at risk for premature, low-birth-weight babies in saliva insulin – to monitor insulin levels.⁴⁰

7. Nutrition

Expectorated whole saliva might one day replace blood as a monitoring medium for

nutritional deficiencies and impaired immune response.

Clinical signs of malnutrition and a compromised immune system frequently appear first in the oral cavity and sIgA (predominant Ig in saliva) acts as first line of defence in protecting against microbe invasive. Total sIgA, sIgA 1, sIgA2, total protein, cortisol may be significant markers for nutritional status.⁴¹

8. Drug monitoring

There has been an increase in interest and use of saliva to monitor drugs. Salivary levels of drugs have been determine d following the intake of therapeutic medications and in pharmacokinetic and metabolic studies.⁴²

List of drugs for which salivary monitoring may be useful is given in table. A number of saliva drug-testing kits are now commercially available. Substances of abuse eg alcohol, cocaine, amphetamines, benzodiazepines, opiates can also be tested in saliva with great ease.⁴³

Salivary level carbamazepine, phenobarbitone and phenytoin demonstrate excellent correlation with their serum levels.⁴⁴

9. Oral diseases

Saliva can be used to detect oral and periodontal infections, to assess susceptibility to dental caries and to screen for oral neoplasma.

Increased concentration of albumin in whole saliva as a marker for stomatitis.⁴⁵⁻⁶⁷ High levels of salivary nitrate, nitrite and nitro somine may be associated with development of oral and gastric cancer.⁴⁶⁻⁶⁹

Also, high MDA levels⁴⁷ and lower AOX status are observed in periodontal diseases.⁴⁷

Vision & challenges for saliva testing

There is a great need for convenient, accurate and non-invasive point-of-care disease diagnostic tools. The challenges are to discover the diagnostic potential and optimize engineering technologies for biofluid saliva to position salivary diagnostics to be a novel, accurate, acceptable and feasible technology.

Possibilities available in salivary diagnostics^{23,48-50}

To use saliva as a non-invasive bio-fluid for systemic disease diagnostics.

1.Nano-technology based salivary biosensors also known as NEMS biosensors (nano-electrical-mechanical systems):

To develop real time, ultra sensitive and ultra specific detection of salivary diagnostic analytes.

2. Lab-on-a-chip prototypes for saliva based disease diagnostics: micro electro mechanical system (MEMS) sensors.

3. Diagnostic molecular targets: salivary proteome

Discriminatory and diagnostic human mRNA are present in saliva of both normal and diseased individuals.

Salivary transcriptone

Normal salivary transcriptome (NSTC) consists of ~ 3000 mRNAs and 180 are common between different normal subjects. NTSC has been profiled and analyzed in saliva from head and neck cancer patients.

While the human salivary proteome is still several years away, the normal salivary proteome has been completed. RNA is as robust and as informative as any other analyte. Thus, salivary transcriptome offers the combined advantages of highthroughput marker discovery in a noninvasive biofluid with very high patient compliance.

Table: Technologies for salivary diagnostics

· NEMS bio sensor

 \cdot Lab on chip : oral fluid NEMS/NEMS chip

· Transcriptome

· Proteomics

· Conventional techniques – ELISA, immuno assay, chemilummiscence, RIA, PCR. Table: Candidate systemic diseases for salivary diagnostics

Cardiovascular disease

Cancer Lung Prostate Ovarian Colon

Alzheimer's

Osteoporosis

Cerebrovascular diseases

Nephritis

Septicemia

Chronic respiratory diseases

Chronic liver disease

Pneumonitis

The vision of current research in oral fluid diagnostics is to provide a point-of-care portable diagnostic platform for definitive diagnostics for these 10 major human diseases, all from a drop of saliva.

With advancers in microbiology, immunology and biochemistry, salivary testing or clinical and research settings is rapidly providn to be a practical and reliable means of recognizing oral signs of systemic illness and exposure to risk factors. The postgenomic era provides opportunities for high through put approaches to genomics and proteomics. The novel technologies of miniaturization in conjunction with disease diagnostics via non invasive biofluid offers a revolutionary damage in medicine.

The components of saliva act as a "mirror of the body's health" and the widespread use and growing acceptability of saliva as diagnostic tool is helping individuals, researchers, health care professionals and community health programs to better detect and monitor disease and to improve the general health of the public.

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The effect of immersion disinfectants on Dimensional stability and reproducibility of commonly used irreversible hydrocolloid: An in-vitro study

*Mohit Kamra, M.D.S, **Rajnish K Singhal, M.D.S.

*Prosthodontics, Ex D.A.V. (C)Dental College, Yamunanagar, **Conservative Dentistry & Endodontics, Ex D.A.V. (C)Dental College, Yamunanagar

Abstract

This study was conducted in D.A.V(C) Dental College Yamunanagar to find the most suitable immersion disinfectant which causes least dimensional changes and preserves the impressions property of reproducibility. Immersion of four randomly selected irreversible hydrocolloid was done for specified period of time in three disinfectants - Glutaraldehyde, Povidone-Iodine and Sodium hypochlorite. Reproducibility was evaluated by determining the extent of reproduction of 25, 50 & 75 micronmetre width lines as per A.D.A Specifications.

Key words: Irreversible Hydrocolloid impression, Disinfectant, Dimensional stability, Reproducibility.

Introduction

In ancient times around 3000 B.C, antiseptics such as pitch or tar, resins & aromatics were used by Egyptians. The fumes of burning chemicals were also used as disinfectants. In 1683 Antonj Van Leuwenhoek developed microscope and proved the existence of microorganisms. The research of Robert Koch in 1881 on disinfecting properties of steam and hot air mark the beginning of science of disinfection. Infection control is a cardinal issue in dental practice.¹⁰

As dental professional we are exposed to a wide spectrum of microorganisms in blood and saliva of patient. Dental treatment procedures starting with making of impression may be the first link in microbial contamination. American Dental Association (A.D.A) & Centre for Disease Control (C.D.C) recommend disinfection of impression materials before being transported to the laboratory,^{3,10} surface

Reprints requests: Dr. Mohit Kamra H.No-85P,Sector-12, Panchkula Mail-drjainraj@rediffmail.com disinfection destroys pathogenic microorganisms.

Materials & Method

The present in-vitro study was done by immersing different brands of irreversible hydrocolloid in disinfectants for different intervals .All samples were divided into four major groups . Each group was further subdivided into two subgroups A & B.

A-Represented samples for determining dimensional stability.

B-Represented samples for determining reproducibility.

Subgroups A & B were segregated into three minor subgroups according to disinfectants (a,b,c). Each having 15 samples.

a- Glutaraldehyde

b- Povidone Iodine

c- Sodium Hypochlorite

Each minor subgroup was further divided into three parts.

Part I-Immersion in disinfectant for 5 minutes.

Part II-Immersion in disinfectant for 10 minutes

Part III-Immersion in disinfectant for 15 minutes

Each part had 5 samples.

Figure 1



For subgroup A a custom tray was fabricated with acrylic resin. Acrylic tray hanger was fabricated . A metal Die with three cones (namely A,B,C) as shown in (Figure 2) was fabricated.

Figure 2



For subgroup B a steel Block containing engraved lines of 25.50,75 micronmetre width was fabricated (Figure 3). A metal ring was made to carry the impression material to the test block and a flat metal plate was used to press the impression material on the ring placed on block. A total of 180 samples were made for subgroup A & B each.

Travelling Microscope(Figure 4) with a least count of 0.01 mm was used for measuring dimensional stability in subgroup A. Distances between points A,B & C were measured.

Figure 3



For subgroup B a comparator mounted with a X10 magnification lens was specially designed. A low angle illumination with a light source attached

Figure 4



to a transformer was used for viewing lines of samples (Figure 5).

Samples in subgroup A,& B were made by making impression of respective dies, pouring impression with die stone (Figure

Figure 5



6). Control impressions were poured immediately.

Expression of results for Dimensional stability was done by determining change in percentage mean area.

Reproducibility was determined by evaluating lines by following criteria-

Score 1- Continuous well defined sharp line was reproduced.

Score 2- Continuous line with loss of sharpness.

Score 3- Break in continuity of line. Score 4- No line reproduced.

Disinfectant showing maximum stability i.e minimal change in percentage area & also preserving the impression property of reproducibility was determined. Stastical Analysis used Mean, Three way analysis

Figure 6



of variance & Newman Keuls test for individual comparison of groups.

Results

Results showed that for 5 minutes immersion in disinfectant, 75% samples of irreversible hydrocolloid show least dimensional changes with Sodium Hypochlorite compared to other disinfectants. For 10 minute immersion 50% samples show least dimensional changes with sodium hypochlorite. For 15 minute immersion 50% samples of irreversible hydrocolloid show least dimensional changes with sodium hypochlorite.

* No particular disinfectant was found to favour all three dimensions.

* Long span dimension distorted more than short span dimensions.

* Reproducibility was comparatively not affected by time period selected for immersion.

Discussion

A number of microorganisms in the dental environment have been linked to debilitating & life threatening diseases. Every effort must be made to avoid cross contamination of these microorganisms & to prevent the potential transfer of disease in a dental setting. Accuracy & surface detail of impression should never be compromised. The use of A.D.A accepted disinfectants require 5 to 30 minutes of immersion disinfection. Immersion in Hypochlorite Iodophors or Glutaraldehyde is recommended by Council on dental materials ,instruments & equipments.

"John A Molinari"¹⁰ stated that Centre for Disease Control has recommended use of 0.05% to 0.5% Sodium Hypochlorite as an effective agent in inactivating Hepatitis B Virus. Glutaraldehyde is A.D.A accepted has high Biocidal activity lodophores have tuberculocidal activity within 5 to 10 minutes of exposure. "Xavier Lepe"⁹ stated that immersion & spray disinfection of the impression are more popular methods than cast disinfection. Immersion disinfection is more reliable than spray disinfection because it guarantees that all surfaces of impression will come into contact with the disinfectant solution. "E.W Skinner" stated that if stone is poured to form cast within 12 minutes after the impression is obtained any change in dimension of impression is negligible. "John B Tullner"¹⁴ studied reproducibility for irreversible hydrocolloid impression material by immersion in disinfectant for 5,10 & 15 minutes by using test block engraved with 25,50& 75 micronmeter width lines. Finest line of 25 micronmeter was used as criteria line.

Individually for each dimension disinfectants have a variable effect. No particular disinfectant was found to favour all three dimensions, indicating that there may be a cause in chemistry of alginate impression material that caused more leaching of ions from gel structure, disrupting the chemical bonds, thus leading to distortion of alginate this is in accordance with study of "Setsuo Saito"¹² who stated that disinfectant by changing osmotic pressure causes leaching of monovalent and divalent metallic ions from alginate impression material leading to distortion of impression.

It was observed that cross-arch dimension had a less significant effect intra arch dimensions on mean than percentage change in area i.e dimensional stability. This is in accordance with the study of "Herrera & Merchant"⁷ who found that maximum cross arch diameter and canine to canine dimension were not significantly affected by immersion disinfection. Long span dimension distorted more than short span dimension. This is in accordance with study of "J F Burton"² who stated that short span impressions appeared to be far less sensitive to distortion than long span impressions regardless of cause . In the present study, it was observed that comparatively time of immersion did not have a significant effect on reproducibility. This is in accordance with study of "Richard D Schnell" who concluded that reproducibility is not dependent on time of immersion. Variations in results of reproducibility could be in accordance with study of "D.H Pratten"¹¹ who stated that disinfectant treatment alters the surface chemistry of impression material changing the hydrophillicity of impression material ,thereby rendering impression more wettable or less wettable by a slurry of gypsum.

The models obtained after immersion disinfection of impression material were either larger or smaller than the control group models, this may effect the prosthesis fit. Large size models can be beneficial in providing space for luting cements in fixed prosthodontics and also for compensation of shrinkage of gypsum during setting. If this factor of model size could be controlled and utilized for counteracting the setting expansion of die stone & casting shrinkage of metals than the accuracy of prosthesis could be improved., thus disinfectant could be provided with beneficial effect of removing microorganisms & improving the fit of prosthesis.

Conclusion

Distortion of an impression is not caused by material alone. Dimensional stability and Reproducibility did not differ significantly for 5,10,15 minutes immersion. The decision in selecting type of impression material depends on individual preference, experience or needs of dentists. Factors such as handling, working characteristics, patients comfort or economics help to determine the choice of impression material.

Further studies may be done to determine potency of disinfectants and effect of many other factors, such as relaxation of stresses, excessive seating pressure, impression technique .Threat of cross infection is raising a challenge to profession- Research & Practice is one small step to meet the challenge.

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Book

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Book chapter

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Erratum

The article entitled "Case-Based Computer Assisted Learning in Prosthodontics" by Dr. Saee S. Deshpande and Dr. Sarin Soumil P. was published in volume 2, number 2 of Indian Journal of Dental Education without figures. The figures of the above said article has been published here. The mistake is regretted.

Editor-in-Chief



Figure 1

Fi	gur	e 2

- Mediline - Om Computer Services , Nagpur						
	Selected Patient 9	Age in years : 47	Sex: Male			
	Welcome	Welcome Case		Treatment Plan		
	Pre-treatr	ment Intraoral View(s)		Radiograph		
	Chief Complaint : Difficulty in masticatio Past Dental History : Patient complains to 5-6 yrs. He was advised desensitising to restorative treatment was advised.	In and poor esthetics due to wo of persistent teeth sensitivity s both paste and a soft brush but	rn teeth ince past no			
	Relevant Medical History : NC			Chief Complaint		
l	Relevant Clinical Examination : Generalised severe tooth wear Loss of VD , drooping lower third of face, fissure corner of mouth Assessment of VDR & O:			Past Dental History		
				Relevant Medical History		
	FWS: 5-6 mm			Relevant Clinical Examination		
	000.04 1111			Radiographs / CT / MRI		
				Vitality Test		

Figure 3



Fi	gur	e 4
	<u> </u>	• •



Figure 5

